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MONTANA'S

TAKE-ALONG WINTER SURVIVAL HANDBOOK

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TAKE-ALONG WINTER SURVIVAL HANDBOOK

Disaster & Emergency Services

A Division of the
Department of Military Affairs
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Montana Department of Transportation

January 1997
Third Edition

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INTRODUCTION

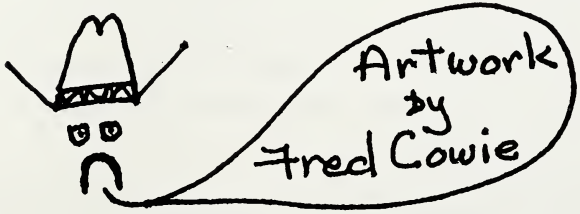
The intent of this publication is to provide basic survival information which may result in a life saved!

It is with a great deal of pride that the Montana Division of Disaster and Emergency Services (MT-DES) presents this handbook. The residents of Montana are great outdoors people. Outside activities range from work to pleasure; from agriculture, ranching and logging to hunting, snowmobiling and skiing.

Because of the size of The Big Sky State, Montanans do a great deal of traveling in the pursuit of their work and play. A large portion of this booklet has been devoted to tips related to safe winter driving and what to do if stranded. Did you know that a hubcap can save your life?

Each winter hundreds of thousands of Montana residents and out-of-state visitors take to our winter wonderland in pursuit of the most fantastic hunting available anywhere. Our ski resorts and cross-country trails are second to none. With the advent of the snowmobile and the all-terrain vehicle, remote areas are now only a short time away. However, when all this modern technology fails, it may be a very long walk out. Do you know how to make a shelter with a jackknife and piece of string?

Ride along as we take you safely down the highway on a winter journey. Enjoy a snowy outing through Montana's breathtaking landscape, confident you have the gear to weather any storm. Allow us to give you some tips on weathering a storm at home. And last, but not least, some thoughts about caring for pets and one of Montana's greatest economic assets, her livestock.



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WARNINGS

The winter wonderland which makes Montana so beautiful can also be life threatening. Winter blizzards, heavy snows, ice storms, freezing rain and high winds can be a serious hazard to our citizens whether at work or play. One of the best defenses is to keep informed. By understanding and observing storm warnings, adequate preparation can be done to lessen the impact of hazardous weather on ourselves, our property and livestock. To take full advantage of weather forecasts, you must know the specific meanings of the terms commonly used:

1. **WATCH vs WARNING**: Let's get a basic definition before we go any further, (these two terms cause more confusion than all the rest). A watch simply means that weather conditions are favorable for a storm, blizzard, tornado or whatever. A warning means, it's here partner!

2. **WINTER STORM WATCH**: Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow).

3. **WINTER STORM WARNING**: Severe winter weather conditions are imminent.

4. **HEAVY SNOW WARNING**: A snowfall of at least six inches in 12 hours or eight inches in 24 hours is expected. (Heavy snow can mean lesser amounts where winter storms are infrequent.)

5. **BLIZZARD WARNING**: Considerable falling and or blowing snow and sustained winds of at least 35 miles per hour is expected for several hours. Most of the snow in a blizzard is in the form of fine powdery particles which are whipped in such great quantities that at times visibility is only a few feet.

6. **HIGH WIND WARNING**: Sustained winds of at least 40 miles per hour or gusts of at least 50 miles per hour are expected to last for one hour. These thresholds are higher for the upper Yellowstone Valley and along the eastern front of the Rockies.

7. **WEATHER ADVISORY**: Weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life threatening.

8. **TRAVELERS' ADVISORY**: This is issued when enough ice and snow are expected to hinder travel, but anticipated conditions are not serious enough to require warnings.

☎ For current weather information ☎

Billings **652-1916**
Glasgow **228-4042**
Great Falls **453-2081**
Helena **449-5204**
Kalispell **755-4829**
Missoula **329-4840**

NOAA WEATHER RADIO

Newspaper, radio and television are all good sources of weather data. However, if you want the most accurate and timely information go to the source itself. You can listen to a weather radio designed to pick up broadcasts of the National Oceanic and Atmospheric Administration (NOAA).

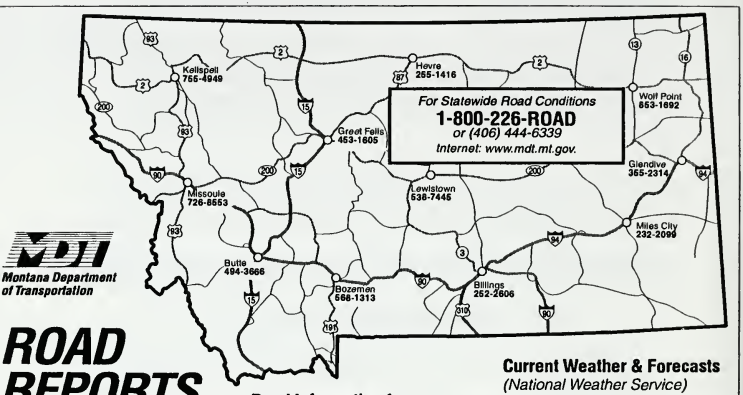
NOAA Weather Radio provides continuous broadcasts of the latest weather information directly from the National Weather Service Offices and these broadcasts are tailored for your specific area. A number of commercial manufacturers offer weather radios designed specifically for receiving NOAA's high frequency transmissions. NOAA Weather Radio broadcasts can usually be heard as far as 40 miles from the transmission site.

In Montana, there are ten stations.

The following NOAA weather frequencies are used in Montana (1-162.550 MHZ, 2 -162.400 MHz 3-162.475):

Missoula	**-**	**2**	**Plentywood**	**-**	**3**
Billings	**-**	**1**	**Havre**	**-**	**2**
Butte	**-**	**1**	**Helena**	**-**	**2**
Glasgow	**-**	**1**	**Kalispell**	**-**	**1**
Great Falls	**-**	**1**	**Miles City**	**-**	**2**

MONTANA DEPARTMENT OF TRANSPORTATION REPORTS



Road conditions in the vicinity of 11 Montene cities ere described in reports eveilebie et the numbers shown ebove. The statewide report (toil-free in the US) summerizes conditions on the interstete system first, then major roeds beginning with roeds in western Montene. It's updeted by 7:30 em and egain in the efternoon, seven deys e week from the end of October until the end of April. Informetion on construction is eveilebie et these seme numbers from April to October. The report is updeted eech Thursdey.

Road Information for Nearby States & Provinces

Idaho	*(208) 336-6600*
North Dakota	*(701) 328-7623*
South Dakota	*(605) 367-5707*
Utah	*(801) 964-6000*
Washington	*(888) 766-4636*
Wyoming	*(307) 237-8411*
Alberta	*(403) 471-6056*
British Columbia	*(900) 451-4997*
Saskatchewan	*(306) 787-7623*

Current Weather & Forecasts
(National Weather Service)

Billings	*652-1916*
Glasgow	*228-4042*
Great Falls	*453-5469*
Havre	*265-6424*
Helena	*443-5151*
Kalispell	*755-4829*
Missoula	*721-3939*

Telecommunications Device for the Deaf (TTY)

444-7696 *1-800-335-7592*

uced by the Customer Service Unit, Montene Department of Trensportetion, es e public service. Phone (406) 444-6200 or write P.O. Box 201001, Helene, MT 59620-1001. (Jan.'97)

Studded tires are legal in Montana October 1–May 31.

TAKING CARE OF A FRIEND

Your automobile can be your best friend or worst enemy, depending on your preparations. Many people totally ignore the maintenance of their car or pickup which may cause a very untimely breakdown. Following good common sense and the manufacturer's preventive maintenance schedule will go a long way to prevent you from being stranded. Make sure everything on this check list is in the best state of repair all year.

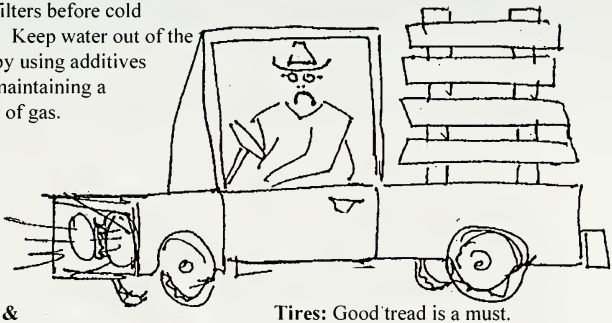
Cooling System: Flush and protect the radiator and engine to well below 0°.

Heater, Defroster, Wipers: These are not only for comfort but they are safety features as well.Check and repair before cold weather.

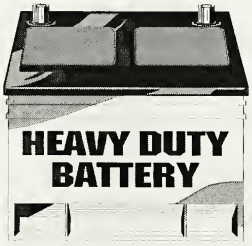
Fuel System: Replace fuel and air filters before cold weather. Keep water out of the system by using additives and by maintaining a full tank of gas.

Lights: Front and rear should be checked for serviceability. These are safety features for you as well as those around you.

Exhaust System: Check for leaks and crimped pipes; repair or replace as necessary. Carbon Monoxide poisoning is deadly and usually gives no warning.



Battery & Ignition System: Should be in top condition and battery terminals must be clean. Minor deficiencies such as dirty battery terminals or old, worn parts, will be greatly magnified in cold weather.



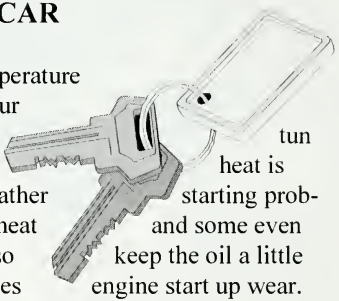
Tires: Good tread is a must. Studded tires can be used in Montana from Oct 1 until May 31. They are 183% better than conventional tires. Chains are 630% better than conventional tires. (See chart on Page 13).

Brakes: Check wear and fluid level. A brake which grabs on ice is a killer.

GETTING GOING

Even with the best maintained vehicle, winter conditions present a variety of aggravating problems. Sometimes the problems can start with trying to get into the car. Freezing rain or moisture and sudden temperature drop can freeze locks. There are a number of lock thaw products on the market, most of which work best as a preventative measure. Try heating the key with a lighter. Another excellent source of heat is an electric hair dryer, (but don't let your spouse catch you).

STARTING A COLD CAR



Starting it at below zero temperature is a terrible thing to do to your car. In addition to a well-tuned engine and good fuel, heat is the best solution for cold weather starting problems. Engine block heaters heat and some even circulate the water. They also keep the oil a little warmer, which greatly reduces engine start up wear. Even leaving a trouble light on overnight under the hood can keep a little of the cold out.

1. If your car won't start and you must use it, you may require a battery boost. Check your battery fluid first. (If the fluid is frozen, chances are your battery is ruined and boost starting will not help.)

   Next, find someone willing to help with a battery of the same voltage. Leave the battery caps off both

batteries. Hook up the booster cables to the live battery first, then hook the positive cable to the positive post of the dead car. Last hook the negative cable to a ground on the dead car (not the negative post); this will greatly reduce the chance of sparks and a resulting explosion.

Run the engine of the live car at fast idle for a few minutes, if possible, to partially charge the dead battery. Start the dead car and remove the cables in reverse order.

2. Use extreme caution with starting fluid. Most starting fluids contain ether, which is very volatile. It is best to have a fire extinguisher available if you attempt to use this product. In addition to the chance of fire, the ether has a tendency to wash the lubricant from the pistons, causing tremendous wear on the pistons and cylinder walls of an engine.

3. And now for a note about water in your fuel system. Water can enter the fuel system by condensation. There is also the possibility you may purchase fuel which has been contaminated with water. A solution to these problems is a product commonly called deicer; note, there's a difference between diesel and gas deicer. A good preventative measure is to periodically add a can to your fuel tank. It does no good to add it to a car which won't start because the deicer must circulate through the system to be effective.

WINTER DRIVING TECHNIQUES

Today, the number of four-wheel drive vehicles is at an all time high in Montana. However, two-wheel drive passenger cars still top the vehicle registration lists. With the salt-free environment of our state, and the mechanical genius of our people, many of the older rear-wheel automobiles are still on duty. Driving characteristics vary greatly among 4X4, front-wheel drive and rear-wheel drive vehicles and are beyond the scope of this manual.

For our discussion we shall deal primarily with the conventional rear-wheel drive truck or passenger car.

1. When attempting to pull out or while going up a slippery hill, use the highest gear possible. This technique applies less power to the drive wheels resulting in less potential of wheel spin. Don't gun the motor! Once your wheels begin to spin, you are in trouble.

   If you have good snow tires and chains, most hills can be negotiated. Coming down a slippery hill requires judicious use of the vehicle's gears. A lower gear can slow your momentum. This is good because you do not have to use the brake as often and there will be less chance of locking the wheels.

   Caution must be used, however, as too low a gear can cause too much back pressure in the engine, resulting in too much drag, which can also lock the drive wheels.

2. Many of the new automobiles have an ingenious safety feature called anti-lock brakes. These are designed to automatically pump the brakes to prevent wheel lock up. Most vehicles on the road do not have this feature. If you do lose control, try pumping your brakes with short repeated pumps instead of just pushing the pedal to the floor and holding it there.

   If this method fails and it seems you are destined to hit something, you may have a choice. A nice snowbank is better than ramming another car or sliding through a crowded intersection.

3. Winter driving is different from summer driving in other respects. Ruts may form in the snow and ice and cause problems. Once in the rut, it is difficult to steer out of it. In an attempt to steer out of a rut, you may be thrown out of control in another direction. High centering your vehicle can also result from ruts or snow build-up under your car.

4. Winter roadway width is usually narrower due to snowplow build-up. In this case, you do not have much margin for error in passing or meeting cars from the opposite direction.

5. Roads that are intermittently dry and icy pose very interesting and dangerous driving problems. This situation calls for extreme caution, reduced speeds and more distance between you and other drivers.

6. Winter driving has a detrimental effect on some drivers. It may make them more nervous, frustrated, tense and perhaps even aggressive. Some drivers, no matter what, will try to drive in winter as they do in summer. Thus, it is even more important to drive defensively and be extra alert to what is happening around you. Drive even further down the road than normal; this means, watch for the driver or the situation that is a wreck about to happen and allow enough stopping distance or maneuver room.

7. A misconception, which must be cleared up, concerns stopping distances of 4X4 and front wheel drive vehicles. Pulling power has absolutely nothing to do with stopping distance. Lock the wheels of a 4X4 on ice and you still have four approximately 6" X 8" patches of rubber sliding down the highway. Many 4X4 and front wheel drive owners are overconfident and that's just plain dumb and dangerous.

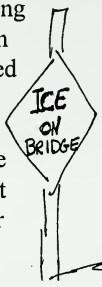
8. Cruise control can become a killer on slick highways! With cruise control, the car either accelerates or decelerates to maintain a constant set speed. This works fine on dry pavement. However, on icy or snow-packed roads use of cruise control can cause accidents. The car may sense a need for increased power to maintain its set speed just as you enter an icy spot. This would have the same effect as if you suddenly stepped down on the accelerator. The result is almost always a break of traction of the drive wheels and a dangerous loss of control.

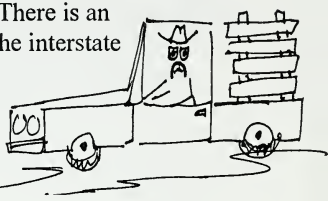
9. If you do get stuck, before you go into the survival mode, there are a few things you can try. Above all remember, **DON'T OVER EXERT**; it's real hard to keep your mind on getting unstuck while you are undergoing a heart attack. First, clear a path in front and behind your wheels. Get the sand bag out of your automobile survival kit and spread sand or gravel on the path you have just cleared. If you forgot the sand, try a floormat under the wheel, branches cut with the axe in your survival kit or just about any other thing you can think of to put under the wheels to give traction.

   Now try "rocking" yourself out. Accelerate forward until the car just begins to lose traction, then quickly move into reverse until the tires begin to break traction, then back the other way. You should gain a little ground each time and eventually break free. A good driver can master this technique with either a standard or automatic transmission; the trick here is timing between engine RPM and gear changes so you don't rip the universal joint out.

   Another idea is to gently accelerate with the emergency brake partially applied; this may prevent the drive wheels from losing traction quite as quickly.

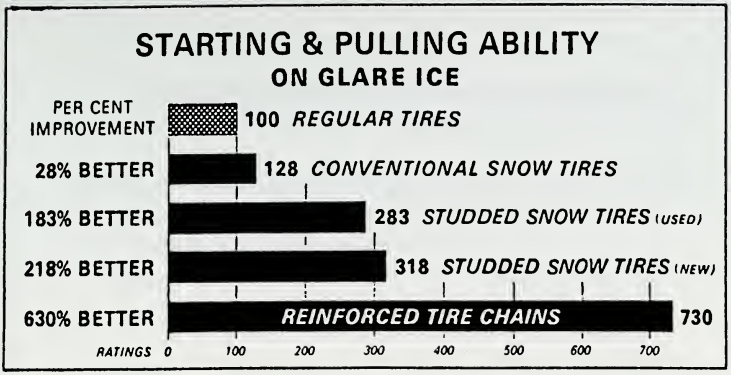
10. Bridges freeze before roads do. Yeah, yeah, most people have heard that so much and have seen the signs so often that it no longer means anything. However, when traveling down the highway at 65 mph thinking how cool you look passing everyone in the slow lane, and you hit one of these iced up bridges, it'll mean something. There is an icy bridge on the interstate just outside of Helena that has every color paint on it to ever come out of Detroit.





ALL ABOUT TIRES & TRACTION

Probably more has been written on the subject of tires than any other part of the automobile. The problem is most of the literature is provided by the tire companies and their advertising claims just add to our confusion. Time was when we had a summer tire and a winter tire, now we have sort of a compromise called an all-season tire. Like most compromises, the all-season really isn't as good as either tire it was intended to replace, certainly it is no panacea. The all-season tread probably falls somewhere between the regular category and the conventional snow tire on the following chart:



This chart summarizes the test results conducted by the National Safety Council on a glare ice course at Steven's Point, Wisconsin. These tests disclosed that conventional snow tires provided only a small improvement in pulling ability as compared with regular tires. Studded tires developed about three times the pull, while reinforced tire chains developed about seven times the pull of regular tires. Some drivers prefer to run studded or snow tires on all four wheels on their two wheel drive passenger cars. The rationale here is improved steering, handling and more predictable stopping.

— A WORD OF CAUTION —

Studded tires are only legal in Montana from Oct 1 until May 31.

▼ No matter what tire you use, you'll have better luck if you take it easy. Don't spin your tires; spinning just

causes friction, which turns snow to ice or digs you in deeper, so apply power gently.

- Keep the tire pressure at recommended levels for normal winter driving. When stuck, try letting some pressure out of the pulling tires; this puts more tread on the road and can really help. If you deflate for traction, reinflate to normal pressure as soon as possible.

- The jury is still out on adding extra weight in the trunk. If done right it can increase traction. The negative side is the possibility of an ill-handling car, not to mention decreased gas mileage. If you do decide to add weight, don't overdo it. Make sure the weight is as close to being over the drive wheels as possible. Obviously, weight in the trunk of a front-wheel drive vehicle is counterproductive.

OTHER TIPS BEFORE YOUR TRIPS

Okay, so you have listened to the weather forecasts, checked the road reports, performed your before-operations maintenance and developed a survival kit. Now you are ready to go, right? Wrong! There are a few more things you should consider:

1. Let someone know when you are leaving, advise them of the route you are taking and when you expect to arrive at your destination. It's like filing a flight plan for your automobile trip.

2. If at all possible, travel in convoy with someone else; there is safety in numbers.

3. As you drive, listen to weather and travel information; road conditions can change mighty fast.

4. As part of your pre-winter cooling system check, do not forget the heater and defroster. These are safety items as well as comfort items.

5. Always keep a full tank of fuel. Stop often and fill up, especially if heading into sparsely populated country, like most of Montana. You are less likely to become stranded with a full tank. If you do become stuck, you will have enough fuel to run the engine and heater. Also, keeping the tank as full as possible will minimize condensation in the tank.

6. Make sure the oil is of a light weight or a multi-weight viscosity. Heavier weight oils congeal more at low temperatures, do not lubricate as well and cause hard starting.

7. Make sure your headlights, tail lights and windows are clean so you can see and be seen. Your headlights can become covered by snow or dirt so gradually that you are not aware of the loss of illumination. With the reduced visibility from a storm, you want someone behind you to see your brake and tail lights.

8. Winter travel on interstates or other major highways will lessen the likelihood of becoming stranded.

9. If winter storm conditions exceed or even test your ability, seek refuge immediately, don't try for the next town.

AUTOMOBILE WINTER SURVIVAL KIT

Winter travel, especially by passenger car, is serious business. You should always carry a survival kit. Your kit can be as extensive as you want, but you should include those items which would allow you to survive 12-24 hours without the benefit of the car heater. A recommended list might include:

- ✔ One sleeping bag or two or more blankets for every person in the automobile.
- ✔ Three pound coffee can, which can be used to heat water.

NOTE: Many of the items on this list can be stored in the can.

- ✔ Matches and candles (a blanket over your head, body heat and the heat from a single candle can prevent freezing).
- ✔ Flashlight and extra batteries, good for signaling for help.
- ✔ Winter clothing to include: cap, mittens, heavy socks, gloves, coveralls, etc, (all of these items can be old or out-of-style items no longer worn).
- ✔ First aid kit, including any special medications for you and your travelers.

- ✔ Bottled water will probably freeze, so allow expansion room in the container.

- ✔ Food — high energy: candy, nuts, raisins, sugar cubes, packaged condensed soups and hot chocolate, bouillon cubes; no perishables.

- ✔ Small sack of sand or kitty litter is good for traction.

- ✔ Shovel, one with a flat blade is preferable, use caution in shoveling snow, as overexertion is not advisable in a survival situation.

- ✔ Basic tool kit to include pliers, screwdrivers, adjustable wrench, tape and wire.

- ✔ Paper towels or toilet tissue, good for their designed purpose as well as for fire starter.

- ✔ Axe or saw, good for cutting wood for fire or branches to place under stuck tires for traction.

- ✔ Tow chain or strap, also a come-along is a handy device to recover your own vehicle.

- ✔ Spare tire, one with air works best.

- ✔ Wire and rope have a multitude of uses, to include automotive repair.

- ✔ Starter fluid, extra oil, gas line deicer and battery booster cables all come in handy.

- ✔ Signaling devices, such as railroad flares, can be seen for

miles. A distress flag can be made from a piece of hunter orange or other bright colored material. Learn more in the following "*automobile parts can save lives*" section.

AUTOMOBILE PARTS CAN SAVE LIVES

Even if you did not complete your survival kit, a calm head and systematic evaluation and dismantling of your vehicle can save your life. Put these automotive parts to good use:

- ✔ A hubcap or sunvisor can be substituted for a shovel.
- ✔ Seat covers can be used as a blanket.
- ✔ Floormats can be used to shut out the wind or for a wraparound.
- ✔ Engine oil burned in a hubcap creates a smoke signal visible for miles. To start the fire, prime with a little gasoline which you can get from your tank with a wire and tissue or rag.
- ✔ Don't forget your horn, it can be heard as far as a mile down wind. (Three long blasts, ten seconds apart, every 30 minutes, is a standard distress signal).
- ✔ A rear-view mirror can be removed and will serve as an excellent signaling device.
- ✔ For warmth and signal, burn a tire, (not on the car)! Release the air pressure, use gasoline, oil, or any other means to ignite it.

IF STORM TRAPS YOU IN CAR

Keep calm if you get in trouble. If your car becomes stuck or you become lost, **DON'T PANIC.** Think the problem through, decide the best thing to do, then do it slowly and carefully. If you are on a well-traveled road, indicate you are in trouble. Remember the signaling devices in your survival kit. If by some chance you overlooked that part of this booklet, try flashing your directional signals, raising the hood on your car and tying something bright to your radio antenna. Then **STAY IN THE CAR!** and wait for help!

The number one rule is: **STAY IN THE CAR**!! Unless there is a house or other help in sight, very close, **STAY IN THE CAR!!** If you run the engine to keep warm, do so sparingly and remember to open a window to protect yourself from carbon monoxide poisoning. Some other tips:

- ✔ Check the exhaust pipe of your car to insure snow has not blocked it. If this happens, you will surely get carbon monoxide in the interior compartment.
- ✔ Exercise, clap your hands, move your arms and legs vigorously or any other isometric exercises you know to keep the circulation going.
- ✔ Take turns on watch if there is more than one person. If you are alone, do not go to sleep. **STAY AWAKE!**
- ✔ Remember your horn. Also if there is a firearm present, shoot into the air three shots, 10 seconds between shots and 30 minutes between volleys. (This is a universally recognized distress code among hunters and other outdoors people.)

TOWING

Winter Towing: A bummer of a deal. Each year many accidents are caused by untrained people towing each other around on snowy streets and highways. The driver of the towed vehicle is at a decided disadvantage for several reasons. Usually the reason for the tow is the towed car is not running; therefore the defroster does not run because it is dependent on the hot water from the engine. At -20° trying to see through an iced windshield is not an easy thing to do. Power steering and power brakes are two other mechanical conveniences found on most cars today that will not work well on a non-running vehicle. Think for a moment about being towed at 50 miles an hour down an icy road, with a 10 foot tow chain (because that's all you found) trying to scrape the ice off the **inside** of the windshield, with poor visibility all around, no heater, very little steering, no brakes and no way to communicate with the driver of the towing vehicle.

If towing is necessary, it is recommended that it be done by an automobile dealer or commercial towing service. Commercial operators are also usually aware of state and local laws pertaining to towing. The legal aspect brings up another point. Any money you might have saved by doing your own tow can easily be offset by body shop bills and moving traffic violations.

SURVIVAL FOR OUTDOOR ACTIVITIES

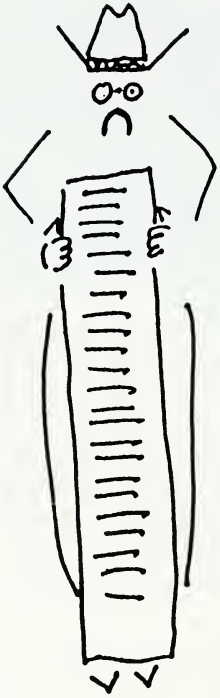
Montanans and tourists alike are taking to the field in increasing numbers both on foot and horseback. Many others access the back country with four-wheel drive vehicles, ATVs and snowmobiles. Occasionally hunters, skiers and other sportsmen become lost or stranded in desolate terrain in severe weather.

The number one rule in the wilderness is **DON'T PANIC**. Don't rush to get out immediately. Many sportsmen have lost their lives because they refuse to admit to themselves and others that they got lost. They are convinced that their truck is just over the next hill. They literally run themselves to the point of exhaustion, hypothermia sets in and they die.

ADMIT THAT YOU ARE LOST and get on with saving your life. If you can admit you are lost one hour before dark and you have the minimum survival gear, by putting that hour to good use, you should suffer no more than a very uncomfortable night and a little harassment the next day.

BACKPACK SURVIVAL KIT

Whether you are an expert outdoors person or a novice, whether you plan to be gone an hour or all day, you must be prepared to stay the night. Many of the car survival items can be transferred to the field. Your outdoors kit should be carried in a backpack and like the car kit, it can be quite extensive. However at a minimum, you should carry:



- ✔ this handbook
- ✔ matches and lighter
- ✔ candles
- ✔ first aid kit
- ✔ lightweight tarp or plastic
- ✔ space blanket
- ✔ hand saw or hatchet
- ✔ canteen of water (U.S. Army type has a nice metal cup for heating water and cooking)
- ✔ whistle (plastic coach-type)
- ✔ signal mirror
- ✔ compass and topographical map (of little use however if you don't know how to use them)
- ✔ commercial fire starter; #000 steel wool works great
- ✔ surgical tubing — good for drinking from streams as well as an emergency tourniquet
- ✔ all-purpose knife - Swiss type is excellent
- ✔ rope
- ✔ tissue or paper towel
- ✔ high energy food: sugar, candy, raisins, trailmix, soup, chocolate, mix, bullion cubes
- ✔ tape
- ✔ flashlight

1. BUILDING A SHELTER

A calm mind and a good analysis of what resources are available can result in a very adequate shelter. In timber country you are limited only to your imagination. The lean-to is most popular today and easiest to construct. Cut two "Y" poles with your hatchet or pocket knife or use two trees with long limbs for the corner poles, place a cross pole between them; place small trees or branches from the cross pole to the ground, butt end up - small end on ground. Take the string or tape from your pack and Interweave cross members for more protection and warmth. Often a large downed log can make a good back for part of the shelter. Take advantage of rock overhangs, a series of dead, intertwined, downfall trees, etc. A realistic appraisal of your situation, a good imagination and sharp hatchet can make you the envy of your neighborhood.

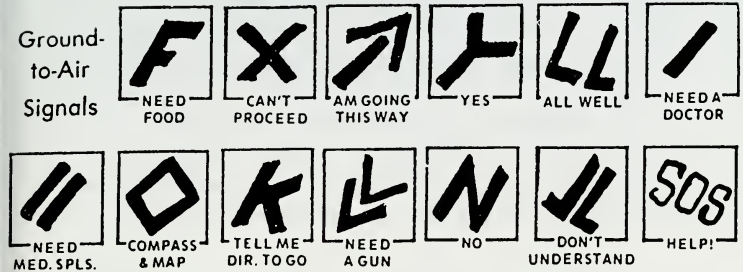
In open country, take advantage of any depression, rock pile, abandoned auto, fence, etc., for a wind-break. Snow caves can provide the warmest shelter possible. Dig your cave on the leeward (downwind) side of a drift. Pine boughs, grass and sticks are suitable to cover the bottom of shelters, however plastic bags or ground tarpaulins are the best. The more pine boughs piled up, the more comfortable you will be.

While it is daylight, get your fire started. You will not start many fires directly from a match. Your survival kit should contain tissue paper, commercial fire starter tablets, steel wool, etc. Pine resin from the wound of a tree is a great starter. If the fire must be started on the snow, build a platform of logs or stones. Place the fire close enough to throw heat into your shelter. Use your space blanket or plastic bag against the back of your lean-to so as to reflect the heat. Once the fire is going, heat water (melt snow) in your canteen cup and heat some soup or chocolate. With a fire and something warm to drink, you can then turn your attention to improving your new home. With the time remaining, gather fuel, it takes an amazing amount to last the night.

2. STAY WITH YOUR SHELTER

Help will come! You **must** believe this! Montana has one of the best and fastest reacting Search and Rescue systems in the country. Be prepared to signal. As was mentioned earlier, three gunshots, three blasts from your whistle, three ground fires, etc., are universally recognized as a distress signal.

You may be spotted from the air. In addition to your fire and its smoke, become familiar with the following ground-to-air signals:



Use natural materials to form the symbol. You can use brush, foliage of any type, rocks, or blocks of snow. In snow covered areas, tramp down the snow to form letters or symbols and fill with contrasting material such as twigs or pine boughs.

AVALANCHE

Snow avalanches pose a very serious threat to the unwary backcountry traveler. The first step in avalanche safety is to recognize that this potential threat exists, while at the same time realizing that with knowledge and experience one can minimize the danger. Most avalanches that injure or kill people are caused by the victims themselves or by other members of their party. Most of these accidents can be avoided.

Avalanches are complicated natural events that are the product of specific terrain, weather, and snowpack conditions. They can not be predicted with certainty, but we can identify levels and trends in snow stability. Frequent, as well as casual, winter-time travelers in Montana's

backcountry should avail themselves of an avalanche safety course. These are offered by avalanche centers, snowmobile and ski clubs, Mt. Dept of Fish, Wildlife, & Parks, Forest Service, Park Service, and other agencies.

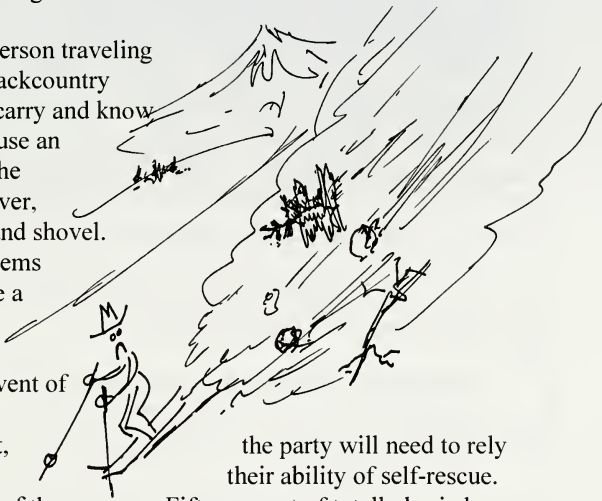
Avalanche centers at Bozeman, Missoula, and Kalispell issue backcountry avalanche advisories for various parts of the state. These describe current weather, snow, and avalanche conditions and are offered as an aid in planning outdoor recreation and work activities. They are easily accessed by calling the following telephone numbers.

Southwest Montana - *Gallatin National Forest*	
Bozeman	☎ (406) 587-6981
Cooke City	☎ (406) 838-2341
West Yellowstone	☎ (406) 646-7912
West Central Montana - *Lolo & Bitterroot National Forests*	
Missoula	☎ (406) 549-4488
Northwest Montana - *Flathead & Kootenai National Forests, Glacier National Park*	
Kalispell	☎ (406) 257-8402
or	1-800-526-5329 Statewide

These advisories are also carried on the Internet at these http addresses:

www.csac.org
www.avalanche.org

Most avalanches occur on slopes of 30-45 degrees and during or shortly after storms. During periods of rapid new snow loading, either from precipitation or wind transport, the new snow hasn't yet had time to strengthen and bond to the underlying snowpack. Rapid warming of the snowpack by sun or rain is also de-stabilizing and often leads to avalanching.

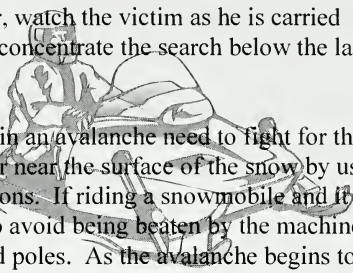


Every person traveling in the backcountry should carry and know how to use an avalanche transceiver, probe, and shovel. These items can save a life.

In the event of an accident, the party will need to rely upon their ability of self-rescue. Time is of the essence. Fifty percent of totally buried avalanche victims die within the first 20-30 minutes of being buried. By the time an organized rescue party responds to an accident, the victim's chances of surviving are very low. Two-thirds of fatality victims die from suffocation, while the other third die from trauma injury.

When traveling in the backcountry and the chance of an avalanche exists, expose only one person to potential risk at a time. The remainder of the party should watch from safe locations, ready to effect a rescue should a slide occur. If a

snowmobile becomes stuck on a potential avalanche slope leave the rider to free the machine alone. Should an avalanche occur, watch the victim as he is carried downslope and concentrate the search below the last seen area.



Victims caught in an avalanche need to fight for their lives. Try to stay on or near the surface of the snow by using swimming motions. If riding a snowmobile and it begins to roll, get away to avoid being beaten by the machine. Discard skis and poles. As the avalanche begins to slow and come to a stop, form an air pocket in front of your face and chest using your hands and arms. At the last moment if possible, thrust a hand or foot above the snow surface. Remain calm in order to conserve oxygen and energy.

For safe travel in the backcountry:

- ☞ Become knowledgeable about avalanches and learn to recognize avalanche terrain and conditions.
- ☞ Always carry and know how to use avalanche safety equipment.
- ☞ Practice safe avalanche route selection and travel techniques.
- ☞ Have an escape plan should an avalanche occur.
- ☞ Always leave a margin for error in judgment.

Enjoy the great Montana backcountry in winter. It offers tremendous beauty and excitement.

WINTER SAFETY TIPS FOR THE HOME

A winter storm could isolate you in your home for several days. Be prepared to be without conventional forms of heating and cooking. As mentioned earlier, keep ahead of the storm by listening to the latest warnings and bulletins on radio and television.

Then:

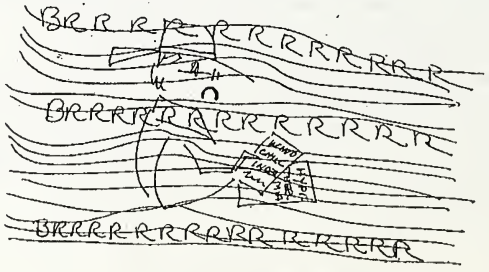
- ✔ Keep a battery powered radio and flashlights in working order, maintain a stock of extra batteries.
- ✔ Maintain a supply of food that can be prepared without heating.
- ✔ Stock emergency water and cooking supplies.
- ✔ Have candles and matches available in case of power outage.
- ✔ Make sure you have sufficient heating fuel; your regular fuel sources may be cut off.
- ✔ Have available some type of emergency heating source and a sufficient supply of fuel so you can keep at least one room in your house warm enough to be livable. Kerosene heaters and wood stoves are good sources of backup heat.
- ✔ Prevent fire hazards due to overheating with coal, oil, or wood burning stoves, fireplaces and furnaces. Have chimneys cleaned by a professional and inspected annually.
- ✔ Keep fire extinguishes on hand, these too need to be professionally maintained. Make sure your family knows how to use them.
- ✔ Stay indoors during a storm. If you must go outside, dress appropriately (see "Dress to Fit the Season," page 30). Avoid overexertion.
- ✔ Don't kill yourself shoveling snow! It is extremely hard work for anyone in less-than-excellent physical condition and can bring on a heart attack, which is a major cause of death during and after a storm.
- ✔ If heavy snow accumulates on your roof you must keep your heating vent systems clear to prevent carbon monoxide poisoning.

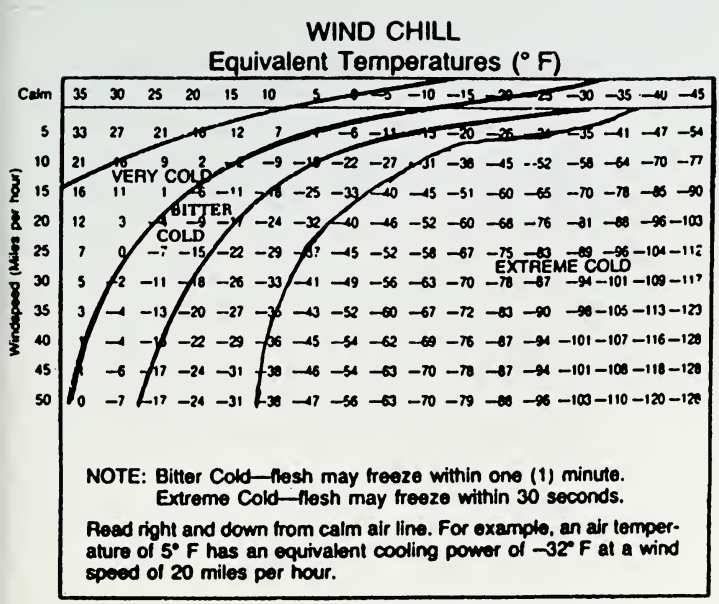
DRESS TO FIT THE SEASON

If you spend much time outdoors during work or recreation, wear loose-fitting, lightweight, warm clothing in several layers. Layers of protective clothing are more effective and efficient than a single layer of tight, heavy clothing. Layers can be removed to prevent perspiring and subsequent chill, and can be replaced as you begin to feel the need for more warmth. Outer garments should be tightly woven, water repellent and hooded. A hood or ski-type mask should protect much of your face and cover your mouth to ensure warm breathing and protect your lungs from extremely cold air. Mittens are better than fingered gloves.

WIND-CHILL INDEX

A very strong wind combined with a temperature slightly below freezing can have the same chilling effect as an actual temperature nearly 50 degrees lower. Arctic explorers and military experts have developed what is called the wind-chill factor, which shows the combined effects of wind and temperature as equivalent calm-air temperatures. The index describes the cooling power of the air on exposed flesh. The wind-chill table provided here shows this cooling power for various combinations of wind and temperature and will help you gauge how much protection you really need.





COLD WEATHER INJURIES

Every winter many unnecessary deaths occur. Listed below are some rather chilling statistics.

Winter deaths related to snow and ice:

- About 70% are automobile related
- About 25% are people caught out in the storm
- The majority are males and over 40 years old

Winter deaths related to exposure to cold:

- 50% are under 60 years old
- Over 75% are males
- About 20% occur in the home

1. WOUNDS AND BLEEDING:

We would like to express our appreciation to the United States Army and their Field Manual 21-76 "SURVIVAL", which serves as the source document for much of this section.

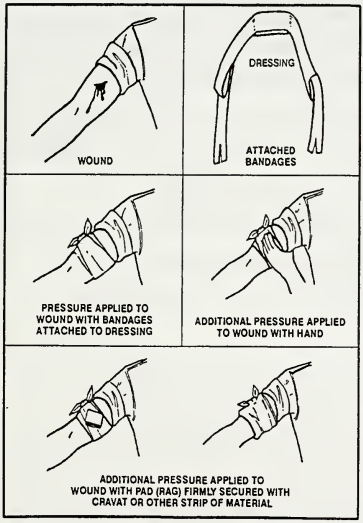
Severe bleeding from any major blood vessel in the body is extremely dangerous, combined with the effects of sub zero weather and the situation rapidly becomes life threatening. Loss of one quart of blood will cause moderate shock; loss of three quarts is usually fatal. External bleeding can be classified according to its source.

ARTERIAL. Arterial blood is that which is moving away from the heart. Bright red blood flows from the wound in spurts or pulses. Because of the pressure exerted by the heart, a large quantity can be lost in a short time. It is the most serious type of bleeding. If not controlled quickly, it can be fatal.

VENOUS. Venous blood is that which is returning to the heart and is usually dark red in color. Pressure is less than from the arteries but bleeding can still be profuse.

CAPILLARY. Capillaries are very small and connect the arteries and the veins. Capillary bleeding is most common and occurs in minor scrapes and cuts. Blood flow is usually slow and oozing. This type of bleeding is not normally difficult to control.

DIRECT PRESSURE. The most effective means of controlling external bleeding is by the application of pressure directly over the wound. Ready made pressure bandages can be purchased from medical supply stores and most drug stores. Add a pressure bandage to each of the first aid kits you have assembled. The bandage has a pressure pad and two long ties. Sterile gauze with a handkerchief or other field expedient measure can be used. The key here is not to waste time looking for the perfect items. If unsterile material must be used, infection can be dealt with later.


WOUND
DRESSING
ATTACHED BANDAGES
PRESSURE APPLIED TO WOUND WITH BANDAGES ATTACHED TO DRESSING
ADDITIONAL PRESSURE APPLIED TO WOUND WITH HAND
ADDITIONAL PRESSURE APPLIED TO WOUND WITH PAD (RAG) FIRMLY SECURED WITH CRAVAT OR OTHER STRIP OF MATERIAL

Firm, even pressure should be applied to the bleeding point until the bleeding stops. Alternate application of and relaxation of pressure to determine if the bleeding has stopped is not desirable. Apply steady pressure up to 30 minutes. In most cases this is sufficient time. Once a pressure bandage has been applied, it should not be removed. If the dressing becomes blood-soaked, sufficient pressure was not generated, and additional pressure must be applied. This can be accomplished by adding pressure to the wound with the hand or with another bandage over the

first. Elevation of the wounded area should be used in conjunction with the additional dressing. If no medical facility can be reached, the bandage can be left in place up to two days, after which it can be removed, the wound inspected, and a smaller bandage applied.

ELEVATION OF THE WOUND. Raising an injured extremity as high above the level of the heart as possible slows blood loss by aiding the return of blood to the heart. Elevation alone will not control bleeding entirely, it must be accompanied by direct pressure over the wound.

TOURNIQUET. Use a tourniquet only when direct pressure over the bleeding point in conjunction with elevation of the extremity fail to control the bleeding. Application of direct pressure is so effective in the control of bleeding that the use of a tourniquet is rarely necessary; furthermore, a tourniquet is not recommended for general use because of the following:

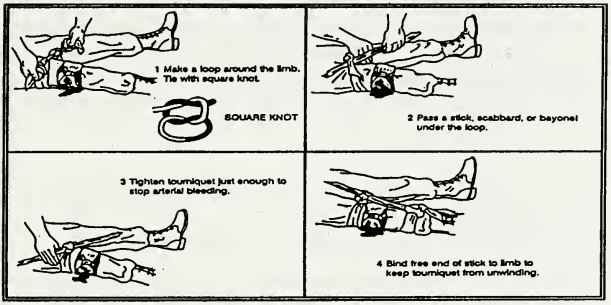
- A tourniquet, properly applied, obstructs blood flow both to and from the wounded area resulting in damage to all tissue. If the tourniquet is left in place too long, the damage to the tissue can progress to total gangrene with subsequent loss of the limb.

- A tourniquet may obstruct venous flow without totally obstructing arterial flow, resulting in more profuse arterial bleeding than before the tourniquet was applied.

- A tourniquet, improperly applied, can cause permanent damage to nerves and other tissues at the site of constriction.

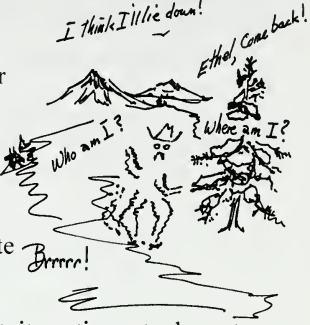
IF YOU MUST USE A TOURNIQUET, you can improvise one from any strong, soft, pliable material such as gauze, a large handkerchief, a triangle bandage, a towel, or other similar item. To minimize damage to nerves, blood vessels, and other underlying tissues, the tourniquet should be 3 to 4 inches wide before it is wrapped around the extremity and at least 1 inch after it is tightened. Apply the tourniquet as follows:

Place the tourniquet around the extremity between the wound and the heart 2 to 4 inches above the wound site. Never place it directly over the wound or over a fracture. Use a stick as a handle to tighten the tourniquet, tightening only enough to stop the flow of blood. After tightening the tourniquet, bind the free end of the stick to the limb to prevent unwinding.


1 Make a loop around the limb. Tie with square knot.
SQUARE KNOT
2 Pass a stick, scabbard, or bayonet under the loop.
3 Tighten tourniquet just enough to stop arterial bleeding.
4 Bind free end of stick to limb to keep tourniquet from unwinding.

After you secure the tourniquet, clean and bandage the wound. A lone survivor **does not** remove or release the tourniquet. If a buddy is present he or she can release the tourniquet pressure every 10 to 15 minutes for 1 to 2 minutes to let blood flow to the rest of the extremity to prevent limb loss.

2. HYPOTHERMIA Commonly called **exposure**, is known to be the number one cause of accidental death in outdoor activities. Hypothermia is the lowering of body temperature under any conditions, although moisture, wind and cold most often are the leading causes. It is compounded by a combination of improper clothing, inadequate shelter and energy depletion. If body temperature goes below 95° Fahrenheit, it continues to drop at an ever-increasing rate. In a short time, the victim becomes unconscious and often the result is freezing to death.



(1) SYMPTOMS to watch for in ourselves and companions are:

- ☞ Poor coordination — Repeated stumbling, poor control of arms and legs.
- ☞ Careless attitude, decreased attention span, daze and memory lapse.
- ☞ Uncontrolled shivering, drowsiness, blurred speech, confusion.
- ☞ Weakness, slowing pace, unable to maintain muscle movement.
- ☞ Disorientation and possible hallucinations and collapse.

(2) TREATMENT for hypothermia:

- ☞ Prevent further heat loss any way possible
- ☞ In advanced hypothermia the body cannot rewarm itself and must be rewarmed from external sources (hot, sugary drinks if victim is conscious).
- ☞ Give mouth-to-mouth resuscitation if breathing stops.
- ☞ Furnish external heat slowly, extremely fast heating can also cause damage, so use caution.
- ☞ Recent medical guidance is not to encourage the patient to exercise.
- ☞ Do not allow the victim to drink any kind of alcohol.

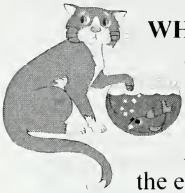
3. **CARBON MONOXIDE POISONING** is a deadly, colorless and odorless gas which can be present when gasoline engines or stoves are operated in an area which is not properly ventilated, such as an automobile, tent, camper etc. Usually there is no warning and no symptoms because carbon monoxide very subtly attacks the oxygen-carrying capability of the blood stream. It may be recognized as dizziness, throbbing headaches or pounding pulse. You may recognize it in others as blue lips, sleepiness or muscle twitching. Fresh air is the immediate cure; in others you may have to apply artificial respiration. Prevention is proper ventilation.

4. **FROSTBITE** is a situation where ice crystals actually form in the victim's skin tissue. You can recognize it on others and maybe even yourself as grayish or yellow-white spots on the skin. Treatment is to restore warmth to the affected area, but not too rapidly. If hot water is available, do not use hotter than 105 degrees. Do not rub frozen flesh or forcibly remove gloves or shoes. Above all, do not rub frozen area with snow.

5. **SNOW BLINDNESS** is caused by unprotected eye exposure to the glare off snow and may be compounded by high altitude. Treatment of snow blindness is cold compresses, aspirin and bandages over the eyes for 16-20 hours. Prevention is the wearing of protective glasses.

6. **SUNBURN** can occur in snow country, especially high altitude. The injury can be very painful, but responds well to treatment and time. Prevention is approved suntan lotions or sunscreens. Cover as much exposed skin as possible while outdoors.

PROTECTION FOR PETS



WHAT TO DO WITH PETS: Many of us consider pets a part of the family. The Montana Disaster & Emergency Services wishes to express its appreciation to the ***Ralston Purina Company*** for providing the enclosed "Winter Pet Care Tips".

WINTER PET CARE TIPS

Winter Poses special risks to pets. Give your pet a safer, healthier cold weather season by following these tips:

- Keep indoor pets in a dry, warm area free of drafts. Elevate your pet's bed off the floor.
- Provide outdoor dogs or cats with a dry, insulated pet house or shelter out of the wind. Staying warm demands extra calories, so feed your pet accordingly when temperatures drop. Bring your pet inside if the wind chill or other weather conditions become severe.
- Remove ice, salt and caked mud from your pet's paws and coat at once. Contact your veterinarian immediately if you suspect your pet has frostbite. Frostbitten skin may turn reddish, white or gray, and it may be scaly or sloughing.
- Cats and kittens often nap on car engines. Knock on the hood or honk the horn; then wait a few minutes before starting the car.
- Pets like the smell and taste of antifreeze, but even a small amount can kill them. Thoroughly clean up spills at once. Tightly close containers and store them where pets cannot get to them.
- Holiday paraphernalia can hurt pets. Cover or tack down electrical cords. Keep tinsel and glass ornaments out of reach. Read warnings on items like spray-on snow. Never put ribbon around a pet's neck or allow it to play with plastic or foil wrappings or six-pack beverage holders.
- Keep your pet on its regular diet. Holiday treats, such as chocolate and bones, can be harmful or toxic.
- Many plants—including Christmas rose, holly, mistletoe, philodendron and dieffenbachia —are toxic to pets. Keep them out of your pet's reach.
- Always have fresh, clean water available.

Courtesy of your veterinarian and Ralston Purina Company

PROTECTION FOR LIVESTOCK

Blizzards take a terrible toll on livestock. For both humane and economic reasons, stockmen should take necessary precautions in advance of severe winter storms.

☞ Move livestock, especially young livestock, into sheltered areas. Shelter belts, properly oriented and laid out, provide better protection for range cattle than shed type shelters.

☞ Sheds may cause cattle to overcrowd, with consequent overheating and respiratory disorders. Cattle running in brush country or lowlands with timber usually survive all right if feed, water and salt are available.

☞ Well-fed stock with a reserve nutrition supply will weather a blizzard much better than a herd which is fed only the minimum. It is recommended that stockmen check with their local county agent to determine the correct feed portion to insure an adequate reserve.

☞ Haul extra feed to feeding areas before the storm arrives. Storm duration is the largest determinant of livestock losses. If the storm lasts more than 48 hours, emergency feed methods may be required. Concentrates in the form of pellets or cakes are excellent for providing emergency rations.

☞ Autopsies of cattle killed by winter storms have shown the major-ity of deaths to be caused by dehydration, not cold or suffocation. Because cattle cannot eat enough snow to satisfy their water intake, stockmen are advised to use water tank heaters to provide livestock with water.

☞ After a blizzard of several days duration, cattle that have been without salt frequently suffer from salt starvation. Take care also that stock do not get too much salt during the recovery period.

HAZARDOUS MATERIALS INCIDENT TIPS

Montana Highways are often dangerous, icy thoroughfares during the winter. The chances of encountering a hazardous materials transportation incident greatly increases during winterstorm months. Here are a few personal safety tips to help keep you healthy.

- ☞ Ask your county DES Coordinator or LEPC Chairperson about Hazardous Materials *Awareness* training in your county.

- ☞ Do not approach hazardous materials incidents unless you have been professionally trained to do so. You may become a victim!

- ☞ Report hazardous materials incidents to Sheriff's, Police, Fire or 911 Dispatch.

The Montana Division of Disaster and Emergency Services wishes to thank the following agencies for the information they shared with us during the research and production of this handbook.

The Federal Emergency Management Agency, U.S. Department of Commerce, American Red Cross, National Weather Service, Montana Department of Transportation, Ralston Purina Company, and Emergency Management Agencies of North Dakota, South Dakota, Wyoming and Washington.

A special thanks goes to the United States Army who for 20 years gave the author of this booklet an opportunity to learn much of this information first hand.

NOTES

NOTES

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The contents herein do not necessarily reflect the views and policies of FEMA or the State of Montana; nor does the mention of trade names or commercial products constitute endorsements or recommendations for use.

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